

We claim :

1. An information carrier comprising: a rigid sheet or web support; an opaque porous receiving layer capable of being rendered substantially transparent by penetration by a lacquer, said receiving layer containing a pigment and a binder; an image provided onto and/or in said receiving layer; a cured pattern of a varnish provided onto said receiving layer provided with said image or onto and/or in said receiving layer provided with said image if said varnish is incapable of rendering said receiving layer transparent; and a cured layer of said lacquer provided on said receiving layer provided with said image and said cured pattern of said varnish, said lacquer having rendered said parts of said receiving layer in contact therewith substantially transparent, wherein said cured pattern of said varnish forms an opaque watermark.
2. Information carrier according to claim 1, wherein the refractive index of the pigment and the refractive index of the lacquer in the receiving layer differ by no more than 0.04 and wherein the refractive index of the binder and the refractive index of the lacquer differ by no more than 0.04 when the ratio by weight of the binder to total pigment becomes larger than 0.17.
- 25 3. Information carrier according to claim 1, wherein said rigid sheet or web support has been preprinted with a security print.
4. Information carrier according to claim 1, wherein said image is applied by an ink-jet process.
- 30 5. Information carrier according to claim 1, wherein said cured layer of said lacquer has been UV-cured.
6. Information carrier according to claim 1, wherein said cured pattern of said varnish has been UV-cured.
- 35 7. Information carrier according to claim 1, wherein said pattern of said varnish is applied by printing, spraying or jetting.
- 40 8. Information carrier according to claim 1, wherein said image is personalized information.

9. Information carrier according to claim 8, wherein said information carrier with personalized information is an identification card.
- 5 10. Information carrier according to claim 9, wherein said identification card is selected from the group consisting of an identity card, a security card, a driver's licence card, a social security card, a membership card, a time registration card, a bank card, a pay card and a credit card.
- 10 11. Information carrier according to claim 1, wherein said support is a rigid sheet is made of polyvinyl chloride, polycarbonate or poly(ethylene terephthalate).
- 15 12. Information carrier according to claim 1, wherein said pigment is an inorganic pigment.
13. Information carrier according to claim 12, wherein said inorganic pigment is silica.
- 20 14. Information carrier according to claim 12, wherein said inorganic pigment has a refractive index from 1.45 to 1.55.
- 25 15. An information carrier comprising: a rigid sheet or web support; an opaque porous receiving layer capable of being rendered substantially transparent by penetration by a varnish, said receiving layer containing a pigment and a binder; an image provided onto and/or in said receiving layer; a cured pattern of said varnish provided in said receiving layer provided with said image; and a cured layer of a lacquer provided onto said receiving layer provided with said image and said cured pattern of said varnish, or onto and/or in said receiving layer provided with said image and said cured pattern of said varnish if said lacquer is incapable of rendering said receiving layer transparent, said varnish having rendered said parts of said receiving layer in contact therewith substantially transparent, wherein said cured pattern of said lacquer forms a substantially transparent watermark.
- 30 35 40 16. Information carrier according to claim 15, wherein the refractive index of the pigment and the refractive index of the lacquer in the receiving layer differ by more than 0.04 .

17. Information carrier according to claim 15, wherein said rigid sheet or web support has been preprinted with a security print.
- 5 18. Information carrier according to claim 15, wherein said image is applied by an ink-jet process.
19. Information carrier according to claim 15, wherein said cured layer of said lacquer has been UV-cured.
- 10 20. Information carrier according to claim 15, wherein said cured pattern of said varnish has been UV-cured.
21. Information carrier according to claim 15, wherein said pattern of said varnish is applied by printing, spraying or jetting.
- 15 22. Information carrier according to claim 15, wherein said image is personalized information.
- 20 23. Information carrier according to claim 22, wherein said information carrier with personalized information is an identification card.
- 25 24. Information carrier according to claim 23, wherein said identification card is selected from the group consisting of an identity card, a security card, a driver's licence card, a social security card, a membership card, a time registration card, a bank card, a pay card and a credit card.
- 30 25. Information carrier according to claim 15, wherein said support is a rigid sheet is made of polyvinyl chloride, polycarbonate or poly(ethylene terephthalate).
- 35 26. Information carrier according to claim 15, wherein said pigment is an inorganic pigment.
27. Information carrier according to claim 26, wherein said inorganic pigment is silica.
- 40 28. Information carrier according to claim 26, wherein said inorganic pigment has a refractive index from 1.45 to 1.55.

29. An information carrier comprising: a rigid sheet or web support; a transparent porous receiving layer capable of being rendered substantially opaque by penetration by a lacquer, said receiving layer containing a pigment and a binder; an image provided onto and/or in said receiving layer; a cured pattern of a varnish provided onto said receiving layer provided with said image, or onto and/or in said receiving layer provided with said image if said varnish is incapable of rendering said receiving layer opaque; and a cured layer of said lacquer provided on said receiving layer provided with said image and said cured pattern of said varnish, said lacquer having rendered said parts of said receiving layer in contact therewith substantially opaque, wherein said cured pattern of said varnish forms a transparent watermark.
- 15 30. Information carrier according to claim 29, wherein the refractive index of the pigment and the refractive index of the lacquer in the receiving layer differ by more than 0.04 and wherein the refractive index of the binder and the refractive index of the pigment differ by no more than 0.04.
- 20 31. Information carrier according to claim 29, wherein said rigid sheet or web support has been preprinted with a security print.
- 25 32. Information carrier according to claim 29, wherein said image is applied by an ink-jet process.
33. Information carrier according to claim 29, wherein said cured layer of said lacquer has been UV-cured.
- 30 34. Information carrier according to claim 29, wherein said cured pattern of said varnish has been UV-cured.
- 35 35. Information carrier according to claim 29, wherein said pattern of said varnish is applied by printing, spraying or jetting.
36. Information carrier according to claim 29, wherein said image is personalized information.
- 40 37. Information carrier according to claim 36, wherein said information carrier with personalized information is an identification card.

38. Information carrier according to claim 37, wherein said identification card is selected from the group consisting of an identity card, a security card, a driver's licence card, a social security card, a membership card, a time registration card, a bank card, a pay card and a credit card.
39. Information carrier according to claim 29, wherein said support is a rigid sheet is made of polyvinyl chloride, polycarbonate or poly(ethylene terephthalate).
40. Information carrier according to claim 29, wherein said pigment is an inorganic pigment.
41. Information carrier according to claim 40, wherein said inorganic pigment is silica.
42. Information carrier according to claim 40, wherein said inorganic pigment has a refractive index from 1.45 to 1.55.
43. An information carrier comprising: a rigid sheet or web support; a transparent porous receiving layer capable of being rendered substantially opaque by penetration by a varnish, said receiving layer containing a pigment and a binder; an image provided onto and/or in said receiving layer; a cured pattern of said varnish provided in said receiving layer provided with said image; and a cured layer of a lacquer provided onto said receiving layer provided with said image and said cured pattern of said varnish, or onto and/or in said receiving layer provided with said image and said cured pattern of said varnish if said lacquer is incapable of rendering said receiving layer opaque, said varnish having rendered said parts of said receiving layer in contact therewith substantially opaque, wherein said cured pattern of said lacquer forms a substantially opaque watermark.
44. Information carrier according to claim 43, wherein the refractive index of the pigment and the refractive index of the lacquer in the receiving layer differ by no more than 0.04 and wherein the refractive index of the binder and the refractive index of the pigment differ by no more than 0.04.

45. Information carrier according to claim 43, wherein said rigid sheet or web support has been preprinted with a security print.
46. Information carrier according to claim 43, wherein said image is applied by an ink-jet process.
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47. Information carrier according to claim 43, wherein said cured layer of said lacquer has been UV-cured.
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48. Information carrier according to claim 43, wherein said cured pattern of said varnish has been UV-cured.
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49. Information carrier according to claim 43, wherein said pattern of said varnish is applied by printing, spraying or jetting.
50. Information carrier according to claim 43, wherein said image is personalized information.
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51. Information carrier according to claim 50, wherein said information carrier with personalized information is an identification card.
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52. Information carrier according to claim 51, wherein said identification card is selected from the group consisting of an identity card, a security card, a driver's licence card, a social security card, a membership card, a time registration card, a bank card, a pay card and a credit card.
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53. Information carrier according to claim 43, wherein said support is a rigid sheet is made of polyvinyl chloride, polycarbonate or poly(ethylene terephthalate).
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54. Information carrier according to claim 43, wherein said pigment is an inorganic pigment.
55. Information carrier according to claim 54, wherein said inorganic pigment is silica.
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56. Information carrier according to claim 54, wherein said inorganic pigment has a refractive index from 1.45 to 1.55.

57. A method for producing a carrier of information, said method comprising the following steps, in order,
 - (1) providing a two-layer assemblage comprising (i) a rigid sheet or web support optionally preprinted with security print, and (ii) a porous opaque receiving layer comprising a pigment and a binder,
 - (2) printing digitally stored information on said porous receiving layer,
 - (3) applying on top of said layer in a predetermined pattern a curable varnish, by means of printing, spraying or jetting,
 - 10 (4) curing said applied varnish, whereby the parts of the receiving layer under said predetermined pattern remain non-transparent,
 - (5) overall covering the thus obtained assemblage by coating, printing, spraying or jetting, with a curable lacquer whereby said lacquer penetrates all areas of the receiving layer not covered by the pattern of the varnish and renders them substantially transparent, and whereby the non-transparent pattern obtained by application of the varnish forms a substantially opaque watermark,
 - 15 (6) subjecting the thus obtained assemblage to a second curing step.
58. A method according to claim 57 wherein the viscosity of the varnish is clearly higher than the viscosity of the lacquer so that the varnish substantially does not penetrate or penetrates very slowly in the receiving layer, while the lacquer does penetrate much faster than the varnish in the receiving layer.
- 25 59. A method according to claim 57 wherein the interval time between application and curing is clearly shorter for the varnish than for the lacquer so that the varnish has not the time to substantially penetrate in the receiving layer, while the lacquer does penetrate in the receiving layer.
- 30 60. A method according to claim 57 comprising the additional step (5bis), performed between steps (5) and (6), of laminating a protective foil on top of the assemblage.
- 35 61. A method according to claim 57 whereby steps (2) to (4) are repeated multiple times according to a fixed pattern over the area of the information carrier, and comprising the additional

step (7) of cutting the finished assemblage into a set of multiple identification cards.

62. A method according to claim 61 wherein said identification card belongs to the group consisting of an identity card, a security card, a driver's licence card, a social security card, a membership card, a time registration card, a bank card, a pay card and a credit card.

10 63. A method according to claim 57, wherein the refractive index of the pigment and the refractive index of the lacquer in the receiving layer differ by no more than 0.04 and wherein the refractive index of the binder and the refractive index of the lacquer differ by no more than 0.04 when the ratio by weight of 15 the binder to total pigment becomes larger than 0.17.

20 64. A method according to claim 57, wherein the digitally stored information is printed on said porous receiving layer by means of ink jet printing.

65. A method according to claim 57, wherein said varnish and said lacquer are UV curable and the different curing steps are performed by means of UV light.

25 66. A method according to claim 57, wherein said digitally stored information is personalized information.

67. A method according to claim 57, wherein said rigid sheet or web support is made of polyvinyl chloride, of polycarbonate or of 30 polyethylene terephthalate.

68. A method according to claim 57, wherein said pigment comprised in said porous receiving layer is an inorganic pigment.

35 69. A method according to claim 68, wherein said inorganic pigment is silica.

70. A method according to claim 68, wherein said inorganic pigment has a refractive index from 1.45 to 1.55.

40 71. A method for producing a carrier of information, said method comprising the following steps, in order,

(1') providing a two-layer assemblage comprising (i) a rigid sheet or web support optionally preprinted with security print, and (ii) a porous opaque receiving layer comprising a pigment and a binder,

5 (2') printing digitally stored information on said porous receiving layer,

(3') applying on top of said receiving layer in a predetermined pattern a curable varnish by means of printing, spraying or jetting, whereby said varnish penetrates said receiving layer,

10 thereby creating a transparent pattern,

(4') after penetration, subjecting the thus obtained assemblage to a curing step,

(5') overall covering the thus obtained assemblage by coating, printing, spraying or jetting, with a curable lacquer,

15 (6') subjecting the thus obtained assemblage to a second curing step, whereby the pattern penetrated by the varnish remains transparent and forms a substantially transparent watermark, and the other parts of the image carrier remain opaque.

20 72. A method according to claim 71, wherein the viscosity of the varnish is lower than the viscosity of the lacquer so that the varnish does penetrate very rapidly in the receiving layer, while the lacquer substantially does not penetrate or penetrates much slower than the varnish in the receiving layer.

25 73. A method according to claim 71, wherein the interval time between application and curing is larger for the varnish than for the lacquer so that the varnish does penetrate the receiving layer, while the lacquer has not the time to substantially penetrate in the receiving layer.

30 74. A method according to claim 71 comprising the additional step (5bis'), performed between steps (5') and (6'), of laminating a protective foil on top of the assemblage.

35 75. A method according to claim 71, wherein said information printed by ink jet in step (2') is personalized information.

40 76. A method according to claim 71, wherein steps (2') to (4') are repeated multiple times according to a fixed pattern over the area of the information carrier, and comprising the additional

step (7') of cutting the finished assemblage into a set of multiple identification cards.

77. A method according to claim 76 wherein said identification card belongs to the group consisting of an identity card, a security card, a driver's licence card, a social security card, a membership card, a time registration card, a bank card, a pay card and a credit card.

10 78. A method according to claim 71 wherein the refractive index of the pigment and the refractive index of the lacquer in the receiving layer differ by more than 0.04.

15 79. A method according to claim 71, wherein the digitally stored information is printed on said porous receiving layer by means of ink jet printing.

20 80. A method according to claim 71, wherein said varnish and said lacquer are UV curable and the different curing steps are performed by means of UV light.

81. A method according to claim 71, wherein said digitally stored information is personalized information.

25 82. A method according to claim 71, wherein said rigid sheet or web support is made of polyvinyl chloride, of polycarbonate or of polyethylene terephthalate.

30 83. A method according to claim 71, wherein said pigment comprised in said porous receiving layer is an inorganic pigment.

84. A method according to claim 83, wherein said inorganic pigment is silica.

35 85. A method according to claim 83, wherein said inorganic pigment has a refractive index from 1.45 to 1.55.

86. A method for producing a carrier of information, said method comprising the following steps, in order,
40 (I) providing a two-layer assemblage comprising (i) a rigid sheet or web support optionally preprinted with security print, and (ii) a porous transparent receiving layer comprising a

pigment and a binder,
(II) printing digitally stored information on said porous receiving layer,
(III) applying on top of said receiving layer in a predetermined pattern a curable varnish, by means of printing, spraying or jetting,
(IV) curing said applied varnish, whereby the parts of the receiving layer under said predetermined pattern remain transparent,
(V) overall covering the thus obtained assemblage by coating, printing, spraying or jetting, with a curable lacquer whereby said lacquer penetrates all areas of the receiving layer not covered by the pattern of the varnish and renders them substantially opaque, and whereby the transparent pattern obtained by application of the varnish forms a transparent watermark,
(VI) subjecting the thus obtained assemblage to a second curing step.

20 87. A method according to claim 86, wherein the refractive index of the pigment and the refractive index of the lacquer in the receiving layer differ by more than 0.04 and wherein the refractive index of the binder and the refractive index of the pigment differ by no more than 0.04.

25 88. A method according to claim 86, wherein the digitally stored information is printed on said porous receiving layer by means of ink jet printing.

30 89. A method according to claim 86, wherein said varnish and said lacquer are UV curable and the different curing steps are performed by means of UV light.

35 90. A method according to claim 86, wherein said digitally stored information is personalized information.

91. A method according to claim 86, wherein said rigid sheet or web support is made of polyvinyl chloride, of polycarbonate or of polyethylene terephthalate.

40 92. A method according to claim 86, wherein said pigment comprised in said porous receiving layer is an inorganic pigment.

93. A method according to claim 92, wherein said inorganic pigment is silica.

5 94. A method according to claim 92, wherein said inorganic pigment has a refractive index from 1.45 to 1.55.

10 95. A method for producing a carrier of information, said method comprising the following steps, in order,

15 (I') providing a two-layer assemblage comprising (i) a rigid sheet or web support optionally preprinted with security print, and (ii) a porous transparent receiving layer comprising a pigment and a binder,

(II') printing digitally stored information on said porous receiving layer,

(III') applying on top of said receiving layer in a predetermined pattern a curable varnish by means of printing, spraying or jetting, whereby said varnish penetrates the receiving layer, thereby creating a substantially opaque pattern,

(IV') after penetration, subjecting the thus obtained assemblage to a curing step,

(V') overall covering the thus obtained assemblage by coating, printing, spraying or jetting, with a curable lacquer,

20 (VI') subjecting the thus obtained assemblage to a second curing step, whereby the pattern penetrated by the varnish remains opaque and forms an opaque watermark, and the other parts of the image carrier remain transparent.

25 96. A method according to claim 95, wherein the refractive index of the pigment and the refractive index of the lacquer in the receiving layer differ by no more than 0.04 and wherein the refractive index of the binder and the refractive index of the pigment differ by no more than 0.04.

30 97. A method according to claim 95, wherein the digitally stored information is printed on said porous receiving layer by means of ink jet printing.

35 98. A method according to claim 95, wherein said varnish and said lacquer are UV curable and the different curing steps are performed by means of UV light.

99. A method according to claim 95, wherein said digitally stored information is personalized information.

5 100. A method according to claim 95, wherein said rigid sheet or web support is made of polyvinyl chloride, of polycarbonate or of polyethylene terephthalate.

10 101. A method according to claim 95, wherein said pigment comprised in said porous receiving layer is an inorganic pigment.

102. A method according to claim 101, wherein said inorganic pigment is silica.

15 103. A method according to claim 101, wherein said inorganic pigment has a refractive index from 1.45 to 1.55.